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HEADLINE: Pres. of Univ. of Md. wants state and university to invest more in commercializing its technology

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The University System of Maryland isn't even on the map when it comes to being a key player in commercializing its technology.

So says C.D. Mote Jr., president of the University of Maryland, College Park.

"We have an asset base which is enormous, but when people look across the country and just stand back and ask where are the hot areas, where is the action, no one would pick Maryland," Mote said. "Nobody. Not even people in the state of Maryland, let alone anybody else.

"We have not linked our assets together in this region at all effectively. And, therefore, we are neither seen as one of the big players and we are not one of the big players," Mote said.

The USM campuses spent \$603.6 million on research in fiscal year 2001, while the University of California system campuses spent \$2.3 billion.

But using an industry standard for calculating the efficiency of an institution puts Maryland on a more equal playing field. The formula looks at invention disclosures, patents filed, and licenses and options executed per \$10 million of research funding.

Using the standard, the University of California system in fiscal year 2001 had 4.13 invention disclosures, secured 3.67 patents, and executed 1.13 licenses and options per \$10 million of research, said Steven L. Fritz, director of technology transfer at the Maryland Technology Development Corp.

In the same year, the USM campuses had 3.48 invention disclosures, secured 3.10 patents and executed 1.11 licensing agreements.

By comparison, "you can see that dollar for dollar the USM lags behind the U Cal system but only by 16 percent for invention disclosures and patents, and is basically even with U Cal on licenses and options," Fritz said.

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USM is being compared to the University of California System because they are similar in make-up -- both public institutions with a mixture of large and small campuses that focus on different things.

Still, many officials agree with Mote that the situation needs to change in Maryland.

"Transferring technology to industry in the development of products has proven to spur economic development," said Ann M. Hammersla, senior counsel for intellectual property and director of the office of intellectual property counsel at the Massachusetts Institute of Technology and president-elect of the Northbrook, Ill.-based Association of University Technology Managers Inc.

The nonprofit association has more than 3,200 technology managers and business executives who manage intellectual property -- one of the most active growth sectors of the U.S. economy.

According to an Association of University Technology Managers survey, about 494 companies were formed in fiscal 2001 as a result of university technology transfers. Most of the new businesses were located near the universities that invented the technology.

The survey also said 4,058 new licenses and options were executed, and 85 respondents identified 287 new products that were first made commercially available to the public that year as a result of the licenses, Hammersla said.

In addition, gross income to universities from their licensing was \$1.071 billion in 2001.

Spin-offs from "university technology licensing have an estimated \$40 billion economic impact," said William P. Tew, associate provost of Johns Hopkins University and assistant dean of the School of Medicine.

Crap shoot

But it can still be a gamble for universities to secure patents and then license their technology to the private sector.

"Technology licensing is very much like Las Vegas," Tew said. "In fact, in many ways Las Vegas is a better bet."

Often, it's difficult for universities to secure partnerships with private companies for their technology.

"If you don't attach these ideas to somebody's return on investment expectations, nothing happens," Tew said. "Capitalism, in spite of all its faults, is still the fairly best method we have."

Other issues can complicate university/industry partnerships.

In the case of therapeutic drugs, "with increasing frequency the industry is seeking for somebody to share downstream liability," Tew said.

"The university feels very strongly, it is not appropriate," Tew said. "We are so far removed from the final product, we have no say in how it's developed and, quite frankly, our share of the upside is so small, that we require absolute indemnity on the part of the licensees."

Universities also have to be savvy about what they pursue because the costs associated with securing patents and issuing licenses are not inconsequential. A full international patent can cost an institution \$250,000 while a U.S. patent can run between \$15,000 and \$40,000, Tew said.

Universities struggle to break even on their costs, for the most part. Only every now and then does a piece of technology actually become a big hit.

The technology managers association's survey shows only 131 of the 22,806 licenses issued yielded \$1 million or

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more in annual income in fiscal year 2001.

But there are other, less tangible, benefits for universities that secure patents and license their technology.

Researchers get royalties for the use of their technology. In fiscal 2002, for example, 1,129 inventors received \$26 million for University of California system inventions.

And at a time of shrinking budgets, technology commercialization is being seen as another tool for recruiting and retaining faculty. Faculty members want to see the fruits of their labor, and the ability to do research that can be patented and commercialized lets them do just that.

It's only in the last few years that some universities have really started to embrace their roles in technology commercialization.

"Universities in this state had not seen this as their role until fairly recently," Mote said.

Prior to the 1980s, the government owned all the intellectual property that came from research that was supported by federal funds. As a result, universities saw little value in partnering with companies to commercialize their research, or to secure patents and issue licenses.

All that changed in 1980 with the passage of the Bayh-Dole Act, which granted ownership of inventions to the entity that developed them, with the understanding that universities would make an effort to license the invention for commercial use.

"Bayh-Dole was what launched the economic revolution, so to speak," Tew said. "It allowed the universities to step in."

A university that elects to take title to an invention must disclose the invention, Tew said, and must file U.S. and international patents and copyrights as appropriate. And any licensing income must be shared with the inventor, with the rest going back into research.

Slowly, institutions have started to see technology commercialization as a viable option.

Many universities created technology transfer offices to manage their technology commercialization activities, but still many lacked the necessary funding, staff and additional resources to be really efficient.

"The offices were being viewed as cost centers," that needed to earn their keep, said Phillip A. Singerman, executive director of TEDCO. As a result, technology would be licensed prematurely by the offices, or more cheaply than they were worth.

Hopkins got into technology transfer slowly, but it has steadily expanded.

Hopkins began its technology transfer efforts with the School of Medicine in 1986, and added the Homewood campus and the Applied Physics Laboratory in the late 1990s, Tew said.

The Homewood and the medical school's technology transfer offices have since been combined because of increasing inter-campus collaboration among investigators, Tew said. The Applied Physics Lab has remained separate.

The Johns Hopkins University Licensing & Technology Development recently moved into 15,000 square feet of new space on the Homewood campus, almost twice the space it previously occupied. The office includes eight senior licensing associates who are skilled in relevant areas of science and about 17 support staff and spends almost \$4 million a year on patent cases, about 65 percent of which is reimbursed by licensees, Tew said.

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Issued patents are approaching 1,000, applications are approaching 2,000 and the institution has an active agreement portfolio exceeding 600, Tew said, and \$9 million to \$10 million in revenues.

Tech transfer gains favor

In recent years, more schools have begun jumping on the bandwagon.

Many universities started "gearing up substantially" or have refocused their technology transfer offices as they realized their importance, said Charles Dilks, a private consultant who was the executive vice president of University City Science Research Park, the biotechnology park affiliated with the University of Pennsylvania.

Like many other schools, the University of Maryland, Baltimore, moved tentatively toward technology transfer. Its office was formed in 1988 and it remained relatively small with very modest resources for its first 10 or 11 years, said James L. Hughes, vice president of research and development at the institution.

But after a commissioned report about four years ago found the office to "lack leadership and vision" and the missions of the office to be "ill-defined and lack coordination," it was refocused, Hughes said.

Today the university spends between \$500,000 and \$600,000 a year on its patent budget, up from the \$100,000 to \$150,000 it spent annually between 1988 and 1999. The university has about 400 patents and applications in its portfolio and about \$300,000 in reserves.

But state university officials worry that budget cuts threaten the progress they have made in technology commercialization.

"We are at a point because of the state budget cuts, we are relying heavily on generating income to keep doing what we are doing," Hughes said. "In the past we were getting \$190,000 from the state towards our patent budget and this year it's \$500."

"I am not sure the state fully comprehends the level of disruption it has caused in these " reductions," Mote said.

He says the cuts "have big impact across the board. It affects everything we do from how we teach our courses to how we run our technology commercialization."

"We are doing our best to work through this " but it has definitely created major problems," Mote said.

Added Hughes, "It is definitely threatening the progress we have made. How do we anticipate the office growing? It's a little difficult to answer that right now. We are trying to avoid shrinking."

Hughes said the institution will have to dip into its \$300,000 in reserves "to maintain activities as best we can for this year. But we do run into real challenge, if the budget does not go back up next year. The effective situation is that we are able to make do this year, but we are counting on the budget going back up next year."

"You've got to work with what you have," said Maryland Department of Business and Economic Development Secretary Aris Melissaratos, "and hope the economy picks up, and when it does we have the capability to move faster than neighboring states."

One thing that Maryland has is a wealth of technology assets: On a per capita basis, Maryland receives the largest concentration of federal dollars for research and development, and the state ranks third in the nation in the number of biotechnology companies.

The Milken Institute, a nonprofit think tank, issued a report in September that said Maryland had the fourth-highest research and development investments in the country, trailing Massachusetts, Colorado, and California, and just ahead

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of Virginia.

But a lack of partnership and communication among the stakeholders -- private industry, federal labs and higher education institutions -- has stymied efforts to make technology transfer work here.

Because of the lack of partnerships among these key players, "the time required from discovery to commercialization has been extremely long," Mote said.

"Partly the length of time is just the time it takes to figure out how to do things. But a great part of the delay is caused by the links between the various parts of this cycle -- those who discover, those who create and those who then have to build and manufacture, and then sell and market," he said.

Some recent steps have been made toward improving that needed public-private partnership.

TEDCO is launching the Maryland Patent Support Program, said TEDCO's Fritz.

The pilot program will help universities get more invention disclosures by paying for 50 percent of the costs associated with securing patents, Fritz said. TEDCO will match the remaining 50 percent.

Maryland is 30 percent below the national average in invention disclosures, which was 5.4 invention disclosures per \$10 million of research in fiscal 2001, Fritz said.

TEDCO has allocated \$250,000 in its fiscal year 2004 budget for this new program, Fritz said.

State officials used June's Biotechnology Industry Organization conference to announce a \$50 million state investment in the Center for Advanced Research in Biotechnology in Rockville, one of the five centers that make up the Maryland Biotechnology Institute.

There is also TEDCO's Federal Laboratory Partnership Program, which is designed to increase the collaboration between Maryland companies and federal research laboratories.

TEDCO recently assisted five companies -- North Star Science & Technology LLC; Waste Processing Solutions; ARCON Welding Inc.; Sterilex Corp.; and Astral Communications -- by providing more than \$80,000 of FLPP funds to help these companies work with The Johns Hopkins Applied Physics Laboratory, the Naval Surface Warfare Center and Aberdeen Proving Ground.

Other initiatives include the I-270 Consortium, a group that includes many of the public and private sector companies and federal labs along the Interstate 270 corridor. The group is trying to develop a "virtual community" aimed at enhancing growth and communication among the businesses in the area.

The Greater Washington Board of Trade recently created the Tech Task Force.

Mote, a co-chairman of the task force, said its goal is to "facilitate changes in policies that are necessary to make it not only possible but advantageous to start tying these assets together for the benefit of tech transfer," in the Washington region.

"We have extraordinary resources in the Greater Washington region," said Caroline L. Cunningham, vice president of regional partnership at the Greater Washington Board of Trade. "We need these assets, like tech, and biotech businesses, universities, and federal labs to work together, so this community can realize its tremendous potential."

But Mote, pointing to successful technology commercialization in places like Silicon Valley and MIT, said more needs to be done.

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"If you look at other states and what helps them get going, the political infrastructure of the state made it go. A lot of these barriers that I am talking about can be broken down by leadership at the top," said Mote, referring to the administration of Gov. Robert L. Ehrlich Jr.

Mote pointed to former Georgia Gov. Zell Miller, who created a partnership of Georgia's six research universities, public and private, in addition to the state government and private companies to create and attract high-tech industries and jobs in Georgia.

Then-Gov. Tom Ridge of Pennsylvania created a model for how to commercialize technology and pull universities and commercial systems together.

"Each state has a different goal," Mote said. "But they have common themes."

All are led by their governors, he said, and have active participation by the states, plus private sector and universities. They have federal resources and very focused goals, and a commitment that this activity is critical to the future of this state.

The Ehrlich administration appointed a commission, headed by Baltimore technology attorney George Pappas that is charged with "helping Maryland achieve its goal of high-tech hegemony."

The commission, which includes biotechnology workers, academics and entrepreneurs, is expected to issue a report in November.

Shareese N. DeLeaver, a spokeswoman for Ehrlich said, "The Pappas Commission is evidence of the governor's commitment to advancing technology in Maryland."

Pappas would not elaborate about the direction of the report, but he says the commission is hard at work and is looking forward to submitting its report in the fall.

"The competition for technology business is fierce and we want Maryland to be a strong competitor," Pappas said.

Mote said one other thing is needed to make tech transfer work: A company of the right scale needs to partner with the universities, and its CEO needs to be on board.

"We need to find the big company that sees its future and the future of the region tied to the partnership of the university," Mote said. "If I look at Maryland, I don't see that company of the right scale. We have lots of company friends, all very good people, all very good companies, but the company has to be off the right scale, so it feels able and willing to benefit from institutional partnership."

The University of Maryland, College Park, recently signed partnership deals with Fujitsu Ltd. to put its East Coast research office close to the university. China also has partnered with the university, putting its first foreign research park next to the institution.

"These, by the way, are very big deals that the state has not quite understood yet because it doesn't yet have the high rpm mentality required to see these opportunities," Mote said in an e-mail.

Once all the pieces are in place, Mote said, "It will allow the state to speak nationally, about what it's doing, what its commitments are and where it's going.

"That's where these other states have profited so well," he said. "That's why I know them so well because they have spoken about what they have done as a state in a very focused way."

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